

## **CLAIMS**

1. A method of scheduling resources on a switched underlay network, the method comprising the steps of:

receiving a request for scheduled resources;  
scheduling the request; and  
coordinating with a data source to transmit data over the scheduled resources.

2. The method of claim 1, wherein the request has constraints, and wherein coordinating with the data source comprises ascertaining whether the data source is able to transmit data in conformance with the constraints.

3. The method of claim 2, wherein the step of coordinating takes place before the step of scheduling.

4. The method of claim 1, wherein the resources are lambdas.

5. The method of claim 1, wherein the request is an underconstrained request.

6. The method of claim 1, wherein the request is a new underconstrained request, the method further comprising the step of optimizing the utilization of scheduled resources by moving scheduled resources allocated to at least one old request to accommodate the new underconstrained request.

7. The method of claim 6, wherein some of the old requests are underconstrained requests and at least one of the old requests is a constrained request.

8. The method of claim 1, wherein the request is a new underconstrained request, the method further comprising the step of optimizing the utilization of scheduled resources by canceling scheduled resources allocated to at least one old request to accommodate the new underconstrained request.

9. The method of claim 8, further comprising inviting resubmission of the canceled old request.

10. The method of claim 1, further comprising relinquishing scheduled resources where the scheduled resources subsequently are no longer required.

11. The method of claim 1, wherein the request specifies the transfer priority, bandwidth requirements, transfer duration, desired transfer time window, and the time of submission.

12. The method of claim 1, wherein the step of scheduling the request is only performed if the method is able to schedule resources within constraints specified in the request.

13. The method of claim 1, wherein the step of scheduling the request will partially schedule the request if the method is only able to partially schedule resources within the constraints specified in the request.

14. The method of claim 1, wherein the step of scheduling the request enables data transfers to occur on demand, rigidly in the future, loosely in the future, and in a manner constrained by external events.

15. The method of claim 1, further comprising the step of notifying a requesting party of the scheduled resources.

16. The method of claim 1, further comprising the step of interfacing with network resources to reserve bandwidth on the switched underlay network.

17. The method of claim 16, wherein the step of interfacing comprises querying the network for its topology and the relevant characteristics of links to be used to fulfill the request.

18. The method of claim 16, wherein the step of interfacing comprises planning a path through the switched underlay network from a data source to a data target, and reserving bandwidth along the path.

19. The method of claim 16, wherein the request is a request for scheduled resources to enable a large data transfer to take place on the switched underlay network.

20. The method of claim 19, further comprising the step of coordinating large data transfer between a data source and a data target.

21. The method of claim 20, wherein the step of coordinating the large data transfer comprises ascertaining the availability of the data source to transmit the data and the availability of the data target to receive the data.

22. A data transfer scheduling service configured to schedule network resources on a switched underlay network, comprising:

a data management service, said data management service being configured to perform network topology discovery, route creation, and path allocation; and

a network resource manager, said network resource manager being configured to interface network devices in the switched underlay network to schedule network resources on the switched underlay network;

wherein at least one of the data management service and the network resource manager is configured to schedule underconstrained requests for the network resources on the switched underlay network.

23. The data transfer scheduling service of claim 22, wherein at least one of the data management service and the network resource manager is configured to obtain information associated with the availability of a data source and optimize a schedule of scheduled underconstrained requests.